



IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Tony P. Chiang and Karl F. Leaser

SERIAL NO.: 09/854,092

FILED: May 10, 2001

TITLE: Method and Apparatus for Improved Temperature Control
in Atomic Layer Deposition

EXAMINER: Unknown

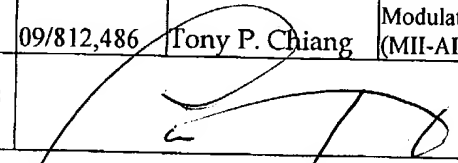
GROUP ART UNIT: 1762

ATTY.DKT.NO.: PA1663US

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WASHINGTON, D.C. 20231

List of Co-Pending Patent Applications That
May Be Directed Towards Similar Subject Matter

Examiner's Initials	Serial Number	First-Named Inventor	Title	Filing Date
THM	09/812,285	Tony P. Chiang	A Sequential Method for Depositing a Film by Modulated Ion-Induced Atomic Layer Deposition (MII-ALD)	03-19-01
I	09/812,352	Tony P. Chiang	System and Method for Modulated Ion-Induced Atomic Layer Deposition (MII-ALD)	03-19-01
THM	09/812,486	Tony P. Chiang	A Continuous Method for Depositing a Film by Modulated Ion-Induced Atomic Layer Deposition (MII-ALD)	03-19-01
Examiner's Signature:				Date 6/24/01

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 1

Complete if Known

Application Number	09/854,092
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Filing Dat	May 10, 2001
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First Named Inventor	Chiang
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Group Art Unit	1762
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Examiner Name	Unknown
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Attorney Docket Number PA1663US

U.S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

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Date	
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¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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Sheet

1

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2

Application Number

09/854.092

Filing Date

May 10, 2001

First Named Inventor

Tony P. Chiang

Group Art Unit

unknown

Examiner Name _____

unknown

Attorney Docket Number

PA1663US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.1	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code2 (if known)			
THM		4,534,842		Amal et al.	08-13-1985	
		4,563,367		Sherman	01-07-1986	
		4,745,337		Pichot et al.	05-17-1988	
		5,061,838		Lane et al.	10-29-1991	
		5,102,687		Pelletier et al.	04-07-1992	
		5,223,457		Mintz et al.	06-29-1993	
		5,227,695		Pelletier, Jacques H. et al.	07-13-1993	
		5,483,919		Yokoyama et al.	01-16-1996	
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		5,605,637		Shan et al.	02-25-1997	
		5,653,811		Chan	08-05-1997	
		5,666,023		Pelletier	09-09-1997	
		5,702,530		Shan et al.	12-30-1997	
		5,916,365		Sherman	06-29-1999	
		6,054,016		Tuda et al.	04-25-2000	
		6,080,446		Tobe et al.	06-27-2000	
THM		6,103,304		Mizuno	08-15-2000	

FOREIGN PATENT DOCUMENTS

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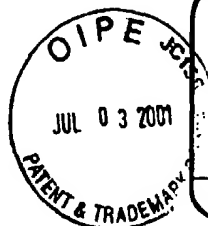
¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 2

Complete if Known

Application Number	
Filing Date	May 10, 2001
First Named Inventor	Tony P. Chiang
Group Art Unit	unknown
Examiner Name	unknown
Attorney Docket Number	PA1663US

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials ¹	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
THM		T.P. CHIANG, et al., "Ion-induced chemical vapor deposition of high purity Cu films at room temperature using a microwave discharge H atom beam source," Journal Vacuum Science Technology, Sep/Oct 1997, pg. 2677-2686, Vol. A 15(5), American Vacuum Society.	
		T.P. CHIANG, et al., "Surface kinetic study of ion-induced chemical vapor deposition of copper for focused ion beam applications," Journal Vacuum Science Technology, Nov/Dec 1997, pg. 3104-3114, vol. A 15(6), American Vacuum Society.	
		K.A. ASHTIANI, et al., "A New Hollow-Cathode Magnetron Source for 0.10um Copper Applications, Novellus Systems, Inc., San Jose, CA.	
		XIAOMENG CHEN, et al., "Low temperature plasma-promoted chemical vapor deposition of tantalum from tantalum pentabromide for copper metallization," Journal Vacuum Science Technology, Sep/Oct 1998, pg. 2887-2890, vol. B 16(5), American Vacuum Society.	
		XIAOMENG CHEN, et al., "Low temperature plasma-assisted chemical vapor deposition of tantalum nitride from tantalum pentabromide for copper metallization," Journal Vacuum Science Technology, Jan/Feb 1999, pg. 182-185, vol. B 17(1), American Vacuum Society.	
		PER MARTENSSON, "Atomic Layer Epitaxy of Copper," Comprehensive Summaries of Uppsala Dissertations from the Faculty of Science and Technology, 1999, pg. 1-45, Acta Universitatis Upsaliensis, Uppsala, Sweden.	
		PER MARTENSSON, et al., "Atomic Layer Epitaxy of Copper on Tantalum," Chemical Vapor Deposition, 1997, pg. 45-50, vol. 3 no.1, Weinheim.	
THM		MIKKO RITALA, et al., "Controlled Growth of TaN, Ta3N5, and TaOxNy Thin Films by Atomic Layer Deposition," Chemical Materials, 1999, pg. 1712-1718, vol. 11 no. 7, American Chemical Society.	

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